Research

Theoretical:

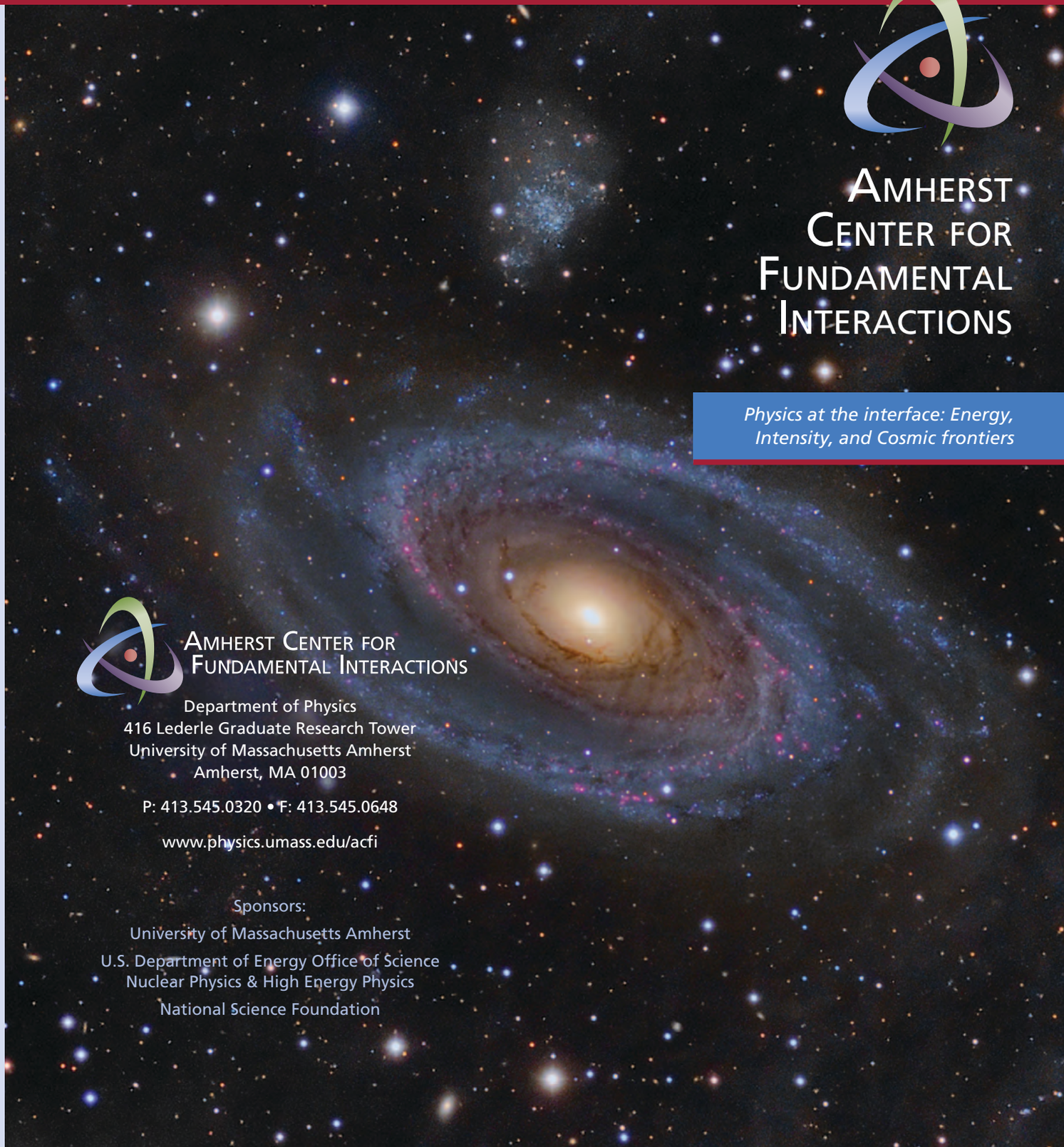
- Origin of matter
- Dark matter
- Beyond Standard Model physics
- Classical & quantum gravity
- Fundamental symmetries & neutrinos
- Quantum Chromodynamics

Experimental:

- LHC-ATLAS new particle searches
- Fundamental symmetry tests
- Neutrinoless double beta-decay searches
- Precision QCD tests
- WIMP dark matter searches
- Gravitational wave searches

Activities

- Topical workshops
- ACFI Seminar series
- Ph.D. student exchanges
- Visiting researcher support
- BSM in Nuclear Physics website
- International research partnerships



Amherst Center for Fundamental Interactions

Physics at the interface: Energy, Intensity, and Cosmic frontiers

Amherst Center for Fundamental Interactions

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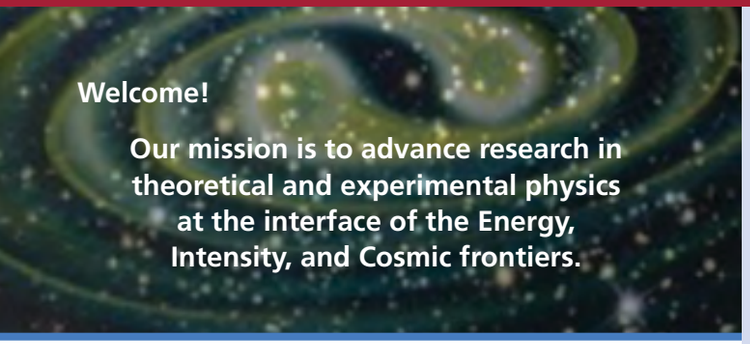

Welcome!

Our mission is to advance research in theoretical and experimental physics at the interface of the Energy, Intensity, and Cosmic frontiers.

We seek answers to key open questions pertaining to nature's fundamental interactions:

- Why is there more matter than anti-matter in the present Universe?
- What is the nature of the dark matter and dark energy?
- What presently unseen forces were active during the first fraction of a second after the Big Bang?
- What does gravitational radiation reveal about the dynamics of astrophysical objects and interactions in the early Universe?
- What can Black Holes teach us about the quantum nature of gravity?
- How does QCD build nucleons and nuclei out of quarks and gluons?

The ACFI addresses these and other questions through

- U Mass faculty, staff, and student research
- International topical workshops
- A visiting researcher program
- Partnerships with other universities and laboratories
- The BSM in Nuclear Physics working group

Research Groups

Fundamental Interactions Theory: *baryogenesis, dark matter, beyond the Standard Model interactions, inflation, electroweak symmetry-breaking, fundamental symmetries, classical and quantum gravity, black holes, neutrinos.*

Faculty: John Donoghue, Gene Golowich (emeritus), Barry Holstein (emeritus), David Kastor, Michael Ramsey-Musolf, Lorenzo Sorbo, Jennie Traschen

Post-docs: Wei Chao, Satoru Inoue, Grigory Ovanesyan, Peter Winslow

Ph.D. Students: Basem El-Manoufi, Benjanim Ett, Huaike Guo, Chien-Yeah Seng, Graham White (visiting)

Experimental Particle Physics: *ATLAS collaboration; exotic particle searches, hidden valley & black hole scenario signatures.*

Faculty: Ben Brau, Carlo Dallapicola, Stephane Willocq

Research Scientist: Ed Moyse

Post-docs: Elisa Pueschel, Dan Ventura, Massimiliano Bellomo

Ph.D. Students: Nathan Bernard, Preema Pais, Tulin Varol

Experimental Nuclear Physics : *Fundamental symmetry tests, nucleon structure, precision low energy QCD tests, electroweak precision tests, WIMP dark matter searches, neutrinoless double beta-decay, solar neutrinos*

Faculty: Laura Cadonati, David Kawall, Krishna Kumar, Rory Miskimen, Gerry Peterson(emeritus), Andrea Pocar

Post-docs: Tim Daniels, Seamus Riordan, Nicholas Saylor

Ph.D. students: Sadeera Bandara, Tyler Kutz, Sereres Johnston, Keith Otis, Ali Rajabi, Jon Wexler

Gravitational and Particle Astrophysics: *gravitational waves, solar neutrinos, WIMP dark matter*

Faculty: Laura Cadonati, Andrea Pocar

Post-docs: James Clark

Ph.D. students: Dan Hoak, Jess McIver, Alex Lombardi

Advisory Board Members

Robert Bernstein (Fermilab)
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